REMARKS

Claims 1-5, 7-37, and 39-51 are pending in the application. Claims 2-5, 7-9, 15-37, and 39-49 are withdrawn from consideration as being drawn to non-elected inventions. Claims 6 and 38 have been canceled without prejudice or disclaimer. Claims 1, 10-14, 50, and 51 are under active consideration.

Claim 1 has been amended to make explicit that the viral-like particle comprises a first L1 capsid protein from one type of virus and a second L1 capsid protein from a second type of virus. Support for the amendment can be found in the specification, for example, at page 3, line 30 through page 4, line 3; page 21, lines 18-19; and Example 5. Accordingly, the specification provides adequate support for this amendment. Entry of the amendment is respectfully requested.

Claim 9 has been amended to make the claim dependent on claim 1. Applicant is amending the claim solely to obtain expeditious allowance of the instant application and not for reasons related to patentability. Entry of the amendments is respectfully requested.

Cancellation and amendment of the claims is made without prejudice, without intent to abandon any originally claimed subject matter, and without intent to acquiesce in any rejection of record. Applicants expressly reserve the right to file one or more continuing applications hereof containing the canceled or unamended claims.

Restriction Requirement

Applicants affirm the election of Group II, which corresponds to claims 1, 10-14, 50, and 51, directed to compositions comprising virus-like particles comprising at least two capsid types. Applicants note that claim 12 is included in Group II and requires rejoinder of claim 9.

A. Unity of Invention standard requires rejoinder of claims drawn to the virus-like particles of Group I and the compositions comprising them of Group II

Applicants submit that claims 2-9, drawn to virus-like particles comprising at least two capsid types of Group I, according to the unity of invention standard, should be examined with the elected claims currently under examination.

The unity of invention standard *must* be applied in national stage applications

Section 1850 of the Manual of Patent Examining Procedure (original 8th edition, published August, 2001) (hereinafter "MPEP") provides:

> ... [W]hen the Office considers international applications ... during the national stage as a Designated or Elected Office under 35 U.S.C. 371, PCT Rule 13.1 and 13.2 will be followed when considering unity of invention of claims of different categories without regard to the practice in national applications filed under 35 U.S.C. 111....
>
> In applying PCT Rule 13.2 to ... national stage applications under 35 U.S.C. 371, examiners should consider for unity of invention all the claims to different categories of invention in the application and permit retention in the same application for searching and/or preliminary examination, claims to the categories which meet the requirements of PCT Rule 13.2....

Id at page 1800-60 to -61.

MPEP section 1893.03(d) reiterates the Examiner's obligation to apply the Unity of Invention standard PCT Rule 13.2 instead of U.S. restriction/election of species practice:

> Examiners are reminded that unity of invention (not restriction) practice is applicable ... in national stage (filed under 35 U.S.C. 371) applications.

Id at page 1800-149, column 1.

Unity of Invention is accepted between claims to a compound and claims to a composition comprising the compound

Example 15, Part 2 of Annex B to the Administrative Instructions Under the PCT provides that unity of invention is accepted between a compound and a composition comprising the compound:

> *Example 15*
> Claim 1: Compound A.
> Claim 2: An insecticide composition comprising compound A and a carrier.
>
> Unity exists between claims 1 and 2. The special technical feature common to all the claims is compound A.

Applicants, therefore, request that the Examiner withdraw the Restriction Requirement at least with respect to claim 9 of Group I, and examine this claim together with the elected composition claim 12 of Group II. As currently amended, the claims of Group I drawn to virus-like particles and the claims of Group II drawn to compositions comprising them do not encompass prior art; therefore, the "objection of lack of unity" based on the reference of Sasagawa et al. (Virology 206:126-135, 1995) is not applicable. Applicants submit that unity of invention exists for claims drawn to the virus-like particles of Group I (*i.e.,* claims 1-5 and 7-9) and claims drawn to compositions containing them (*i.e.,* claims 10-14) based on the rules concerning unity of invention under the Patent Cooperation Treaty.

Unity of Invention exists with respect to dependent claims in the same claim category as the independent claim from which they depend

MPEP section 1850(A) and 1893.03(d), which recite the provisions of paragraph (c) of Part 1 (entitled "Instructions Concerning Unity of Invention") of Annex B (entitled "Unity of Invention") to the Administrative Instructions Under the PCT, provides:

> **(A) Independent and Dependent Claims.**
>
> Unity of invention has to be considered in the first place only in relation to the independent claims in an international application and not the dependent claims. By "dependent" claim is meant a claim which contains all the features of another claim and is in the same category of claim as that other claim (the expression "category of claim" referring to the classification of claims according to the subject matter of the invention claimed for example, product, process, use or apparatus or means, etc.).
>
> (i) If the independent claims avoid the prior art and satisfy the requirement of unity of invention, no problem of lack of unity arises in respect of any claims that depend on the independent claims. In particular, **it does not matter if a dependent claim itself contains a further invention**.... (Emphasis added.)

See MPEP section 1850(A) at page 1800-61. See also MPEP Appendix AI at page 53.

Accordingly, claims 2-9, drawn to virus-like particles should also be examined together with claim 1 from which they depend.

Rejoinder

Applicants request that claims 15-26, drawn to methods of making the virus-like particles of Group I, and claim 37, drawn to a method of using the virus-like particles of Group I, be rejoined per the Commissioner's Notice in the Official Gazette of March 26, 1996, entitled "Guidance on Treatment of Product and Process Claims in light of In re Ochiai, In re Brouwer and 35 U.S.C. § 103(b)" which sets forth the rules, upon allowance of product claims, for rejoinder of process claims covering the same scope of products. Applicants request that claims 15-26 and 37 be rejoined and examined upon allowance of claim 1.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 10-14 and 50 have been rejected under 35 U.S.C. § 112, second paragraph, as allegedly being "indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention." (Office Action, page 2). In particular, the Office Action alleges that claims 10 and 50 are vague and indefinite because the claims are directed to "a 'composition comprising' which means there is

more than one element present" and the claims have "defined only one element, and the other elements that form a composition is/are missing." (Office Action, page 2.) Applicants respectfully traverse the rejection.

As set forth by M.P.E.P. § 2111.03, regarding the use of transitional phrases in claims:

> The transitional term "comprising", which is synonymous with "including," "containing," or "characterized by," is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., *Invitrogen Corp. v. Biocrest Mfg., L.P.*, 327 F.3d 1364, 1368, 66 USPQ2d 1631, 1634 (Fed. Cir. 2003) ("The transition 'comprising' in a method claim indicates that the claim is open-ended and allows for additional steps."); *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997) ("Comprising" is a term of art used in claim language which means that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim.); *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 229 USPQ 805 (Fed. Cir. 1986); *In re Baxter*, 656 F.2d 679, 686, 210 USPQ 795, 803 (CCPA 1981); *Ex parte Davis*, 80 USPQ 448, 450 (Bd. App. 1948) ("comprising" leaves "the claim open for the inclusion of unspecified ingredients even in major amounts").

Applicants submit that the use of the term comprising to indicate that a claim is open-ended is proper and does not require the inclusion of more than one element in the claim.

For at least these reasons, Applicants respectfully request that the rejection under 35 U.S.C. § 112, second paragraph be withdrawn.

Rejections under 35 U.S.C. § 102

Claims 1, 10, 50, and 51 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by the reference of Sasagawa et al. (1995) Virology 206:126-135. In particular, the Office Action alleges:

> Sasagawa et al taught expression of both capsid proteins of two different types of human papillomavirus (HPV) namely HPV-16 and HPV-6 in yeast (see the abstract, and Table 1). The claiming of a new use, i.e., induction of immune response, which is inherently present in the prior art, does not necessarily make the claim patentable. (Office Action, page 3.)

In addition, claims 1, 10-12, 50, and 51 have been rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by the reference of Buonamassa et al. (1997) Virus Research 47:126. In particular, the Office Action alleges that "Buonamassa et al taught expression of HPV-16 and HPV-6 in yeast and taught induction of immune response in mice (see abstract)." (Office Action, page 3.)

Applicants respectfully traverse the rejections under 35 U.S.C. § 102(b) on the following grounds.

For a reference to anticipate claimed subject matter under 35 U.S.C. § 102, "the reference must teach every aspect of the claimed invention either explicitly or implicitly." M.P.E.P. § 706.02. Applicants respectfully submit that the references of Sasagawa et al. and Buonamassa et al. do not teach or suggest all aspects of the Applicants' invention, either explicitly or implicitly.

The reference of Sasagawa et al. does not disclose a mosaic viral-like particle comprising a first L1 capsid protein from one type of virus and a second L1 capsid protein from a second type of virus. Although, Sasagawa et al. disclose a method for coexpression of HPV H16 L1 and HPV H6 L2 in *Schizosaccharomyces pombe*, Sasagawa et al. fail to disclose any method for coexpression of H16 L1 and H6 L1. Nor do Sasagawa show that their method produces any mosaic VLPs. In fact, Sasagawa et al. state that "the L2 protein seems to be neither incorporated in the virus-like particles nor associated with L1 protein, because no L2 protein (75 kDa) was detected in purified VLP and no interaction between the L1 and L2 proteins was observed in the coimmunoprecipitation assay" (page 135, col. 1). Thus, Sasagawa et al. fail to show that the L1 and L2 capsid proteins from H6 and H16 viral strains coassemble in VLPs under their experimental conditions. Therefore, Sasagawa et al. fail to teach all the limitations of the claims.

The reference of Buonamassa et al. is an abstract of one paragraph that merely mentions hybrid VLPs. However, for the invention to be anticipated, the reference must describe every element of the claimed invention with sufficient detail such that a person of ordinary skill in the art could practice the invention without undue experimentation.

As set forth in *In re Donohue*, 226 USPQ 619 (CA FC 7/3/1985):

> It is well settled that prior art under 35 U.S.C. § 102(b) must sufficiently describe the claimed invention to have placed the public in possession of it. *In re Sasse,* 629 F.2d 675, 681, 207 USPQ 107, 111 (CCPA 1980); *In re Samour,* 571 F.2d at 562, 197 USPQ at 4; *see also Reading & Bates Construction Co. v. Baker Energy Resources Corp.,* 748 F.2d 64, 651-52, 223 USPQ 1168, 1173 (Fed. Cir. 1984). Such possession is effected if one of ordinary skill in the art could have combined the publication's description of the invention with his own knowledge to make the claimed invention. *See In re LeGrice,* 301 F.2d at 939, 133 USPQ at 373-74. Accordingly, even if the claimed invention is disclosed in a printed publication, that disclosure will not suffice as prior art if it was not enabling. *In re Borst,* 345 F.2d 851, 855, 45 USPQ 554, 557 (CCPA 1965), *cert. denied,* 382 U.S. 973, 148 USPQ 771 (1966.)

Applicants submit that the abstract of Buonamassa et al. cited by the Examiner would not have enabled a person of ordinary skill in the art to practice the claimed invention. The development of methods for producing the mosaic VLPs described in the instant application entailed significant difficulty and experimentation. The methods disclosed in the specification, for example, at Examples 1-3, which describe the design of vector constructs and expression of capsid proteins in particular yeast strains; Examples 4 and 5, which describe preparation and characterization of mosaic VLPs; and Example 6, which describes immunization with mosaic VLPs; are not disclosed in the abstract of Buonamassa et al. Thus, one cannot easily accomplish what the claims require based on the inadequate information disclosed in the abstract without undue experimentation.

Furthermore, the abstract of Buonamassa et al. describes the inventors' aim to produce a diploid yeast strain expressing four antigens, but not a successful reduction to practice. Nor is it obvious how the expressed capsid proteins from different strains would coassemble. The abstract also fails to disclose the claimed mosaic VLPs comprising L1 capsid proteins from at least two different viral strains.

For at least these reasons, withdrawal of the rejections under 35 U.S.C. § 102(b) is respectfully requested.

Rejection under 35 U.S.C. § 103

Claims 1, 10-14, and 50-51 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the reference of Sasagawa et al. (1995) Virology 206:126-135 in view of the reference of Ott et al. (1995) Vaccine Design, pp. 277-296. In particular, the Office Action alleges that "one of ordinary skill in the art at the time of filing would have been highly motivated to mix the product taught by Sasagawa et al. with adjuvant taught by Ott et al to obtain enhanced immune response" (Office Action, page 4).

In addition, claims 1, 10-14, and 50-51 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over the references of Buonamassa et al. (1997) Virus Research 47:126 in view of the reference of Ott et al. (1995) Vaccine Design, pp. 277-296. In particular, the Office Action alleges that "one of ordinary skill in the art at the time of filing would have been highly motivated to mix the product taught by Buonamassa et al. with adjuvant taught by Ott et al to obtain enhanced immune response" (Office Action, page 5).

Applicants respectfully traverse the rejections under 35 U.S.C. § 103 on the following grounds.

To support an obviousness rejection under 35 U.S.C. § 103, "all the claim limitations must be taught or suggested by the prior art." M.P.E.P. § 2143.03. In addition, "the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure." M.P.E.P. § 706.02.

As mentioned above, the reference of Sasagawa et al. does not disclose or suggest a mosaic VLP comprising a first L1 capsid protein from one type of virus and a second L1 capsid protein from a second type of virus. The secondary reference of Ott et al. also fails to teach or suggest such VLPs.

The reference of Buonamassa et al. fails to describe methods of preparing the claimed VLPs in sufficient detail to enable one of ordinary skill in the art to reproduce them. The reference of Ott et al. fails to fill the gaps. Ott relates to MF59 and does not

pertain in any way to HPV hybrid VLPs comprising capsid proteins from more than one type of virus. Thus, the reference of Ott et al. fails to provide the necessary enablement.

For at least the above reasons, withdrawal of the rejections under 35 U.S.C. § 103(a) is respectfully requested.

CONCLUSION

In light of the above remarks, Applicants submit that the present application is fully in condition for allowance. Early notice to that effect is earnestly solicited.

If the Examiner contemplates other action, or if a telephone conference would expedite allowance of the claims, Applicants invite the Examiner to contact the undersigned.

The Commissioner is hereby authorized to charge any fees and credit any overpayment of fees which may be required under 37 C.F.R. §1.16, §1.17, or §1.21, to Deposit Account No. 18-1648.

Please direct all further written communications regarding this application to:

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